

## SLIDE FASTENER WITH SEPARABLE BOTTOM END STOP

### BACKGROUND OF THE INVENTION

#### Field of the Invention

This invention relates to a configuration of a reinforcement portion for reinforcing a fastener tape provided continuously to a box pin, an insert pin or a box attached to an end portion of the fastener tape in a separable bottom end stop provided on a slide fastener.

#### Description of the Related Art

In recent years, in the slide fastener field, provision of a product having a simplified structure, which realizes a cheap price and excellent quality, has been demanded in the market. This tendency is remarkably apparent in a slide fastener with a separable bottom end stop which is used in an opening/closing section in the front body of clothes and capable of connecting or disconnecting end portions of fastener tapes.

Conventionally, in an ordinary product of the slide fastener with a separable bottom end stop, fastener elements are attached along opposing side edges of a pair of fastener tapes and the separable bottom end stop constituted of a box pin, a box and an insert pin is attached to the bottom ends of the fastener elements. Then, a reinforcement tape in which an adhesive layer is provided on the rear face of a plain woven fabric (taffeta) or synthetic resin film is bonded to the

fastener tape at a portion to be provided with the separable bottom end stop in order to reinforce the portion for stabilization and then, the separable bottom end stop is attached.

The slide fastener with the separable bottom end stop having the reinforcement tape requires the reinforcement tape in order to reinforce the fastener tape so that the quantity of components of the slide fastener increases thereby increasing product cost. Further, because a step of bonding the reinforcement tape and a bonding machine are always required in a process for manufacturing the slide fastener and thus, the manufacturing process cannot be simplified, an increase in product cost is induced.

On the other hand, for example, Japanese Utility Model Application Publication No. 41-17374 has disclosed a separable bottom end stop for a slide fastener in which a box pin, an insert pin and a net-like reinforcement piece are formed by injection molding using synthetic resin in a condition in which it is deviated by half pitch on the front and rear surfaces of the fastener tape without bonding any reinforcement tape on the end portion of the fastener tape.

Because in this separable bottom end stop for the slide fastener the outer peripheral edge of its reinforcement piece has a sharp corner, the reinforcement piece is likely to be caught by other things and separated from the base fabric.

Further, because the reinforcement piece is provided widely and largely toward the outer peripheral edge of the fastener tape, the fastener tape on that portion becomes rigid, so that when the slide fastener is sewed to an object fabric, a sewing needle makes contact with the reinforcement piece and frequently is broken. Additionally, when the separable bottom end stop is connected or disconnected, an external force such as twisting force or bending force is repeatedly applied on the reinforcement piece, which breaks the reinforcement piece. This problem should be solved.

Further, for example, US Patent No. 3435489 has disclosed a slide fastener with a separable bottom end stop in which the separable bottom end stop and a horizontal grid structure are provided integrally at an end portion of a fastener tape while a reinforcement portion is provided on the surface of the fastener tape by forming an oblique grid structure integrally adjacent to the former grid structure.

In the slide fastener with the separable bottom end stop, an internal portion of the reinforcement piece connected to a box pin, a box and an insert pin is constructed of ribs extended in parallel in the width direction of the fastener tape and ribs extended in parallel in the length direction of the fastener tape such that concave portions formed between the ribs are arranged. Thus, although the largest load is put on this portion when such an external force as bending or twisting is

applied to the fastener tape, it is not durable and easy to damage, which is a problem to be solved. Further, because a grid structure in which plural ribs running obliquely with respect to the width direction of the fastener tape intersect with each other is formed in a portion extending from the connecting portion to an outer edge of the fastener tape, that is, a portion in which the fastener tape is sewed on clothes fabric, many ribs intersect with sewing line in which sewing yarn runs, so that the frequency that the sewing needle contacts the ribs at the sewing time increases thereby leading to breaking of the ribs, which is a problem to be solved.

The invention has been accomplished in views of the above-described problems and an object of the invention is to provide a slide fastener with a separable end stop which is unlikely to be damaged when an external force is applied on a fastener stringer intending to bend it in the direction of the front and rear surfaces. Because plural ribs are disposed obliquely in the connecting portion between the separable bottom end stop and a reinforcement portion, that is, an inside portion of the reinforcement portion on which the largest load is applied, the external force is easily scattered and reduced thereby making the slide fastener hard to be damaged. At the same time, separation of the reinforcement portion from clothes fabric when it is caught by other things is also prevented.

In addition to the above-described object, a second

object of the invention is to provide the slide fastener with the separable bottom end stop, in which the reinforcement portions are formed on both surfaces of a fastener tape by integral molding such that the fastener tape is sandwiched thereby while each of the reinforcement portions include an inside portion having a stabilized configuration or flexibility.

In addition to the above-described objects, a third object of the invention is to provide the slide fastener with the separable bottom end stop capable of preventing the inside portion of the reinforcement portion from being damaged by scattering an external force applied to the inside portion of the reinforcement portion.

Further, in addition to the above-described objects, a fourth object of the invention is to provide the slide fastener with the separable bottom end stop which can be provided with a reinforcement structure for the ribs in the inside portion of the reinforcement or a variable structure for the ribs. More specifically, this object is to provide the slide fastener with the separable bottom end stop in which the inside portion of the reinforcement portion is provided with a concave portion which, when a twisting force is applied to an end portion of the fastener tape, absorbs part of the external force to reduce the applied load. Furthermore, a fifth object of the invention is to provide the slide fastener with the separable bottom end

stop in which frequency of contact of a sewing needle and ribs when a fastener tape is sewed on clothes or the like are reduced in order to prevent the ribs from being damaged in an outside portion of the reinforcement portion.

Moreover, a sixth object of the invention is to provide the slide fastener with the separable bottom end stop, in which, even when the fastener stringers are cut with heat, the end portion never turns rigid, particularly no lump is generated in a core portion, securing an excellent texture to the skin and even when a twisting force is applied to the end portion of the fastener tape, the ribs in the reinforcement portion are never separated from the tape. Further, a seventh object of the invention is to provide the slide fastener with the separable bottom end stop, in which the outside portion of the reinforcement portion can be fixed on the fastener tape firmly in order to prevent the reinforcement portion from being separated, thereby ensuring a long term use while the inside portion of the reinforcement portion is formed into an optimum structure capable of exerting its effective function.

#### SUMMARY OF THE INVENTION

In order to achieve the above objects, according to a first aspect of the present invention, there is provided a slide fastener with a separable bottom end stop in which fastener elements are attached to opposing side edges of a pair of

fastener tapes, comprising a separable bottom end stop of synthetic resin constituted of, for example, a box, a box pin, and an insert pin, which is attached by integral molding to each of opposing side edges of the fastener tapes adjacent to the fastener elements, and a reinforcement portion for reinforcing the fastener tape, the reinforcement portion being formed integrally with the separable bottom end stop and extended toward at least one surface of the fastener tape, wherein the reinforcement portion is formed of plural ribs disposed obliquely as seen in its plan view, which are provided in an inside portion connected to the separable bottom end stop.

In addition to the above constitution, preferably, the reinforcement portion is so configured that the ribs are disposed symmetrically on both surfaces of the fastener tape while the inside portion connected to the separable bottom end stop is formed thinner than an outside portion. It is desired that the intersecting portion of the ribs formed in the inside portion of the reinforcement portion is formed in an arc-like configuration as seen in its plan view. Further, preferably, a concave portion is formed in, for example, a through-hole shape or a concave shape having a thin bottom portion, among the ribs in the inside portion of the reinforcement portion. Preferably, a cut-out which is dented toward a top end is formed in the bottom edge of the inside portion of the reinforcement portion.

It is preferable that the reinforcement portion formed on the fastener tape is constituted of the inside portion connected to the separable bottom end stop and the outside portion which is connected to the inside portion and extended toward an outer edge of the fastener tape while the outside portion is formed of plural ribs disposed in parallel in the width or length direction with a predetermined interval.

Further, preferably, a core portion and the fastener tape are cut with heat with front ends of a box pin and an insert pin as reference points, and bottom ends of the inside portion and outside portion of the reinforcement portion are visually recognized that it is located inside of the cut line.

Moreover, a side edge portion of the fastener tape opposing the outer end portion of the reinforcement portion opposite to the box is formed into a rough structure and the end portion of the reinforcement portion penetrates into the rough structure of the tape.

Preferably, in the inside portion of the reinforcement portion, width from an inside end faces of the fastener elements toward an inside of the fastener tape is within 4.0 mm. .

#### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front view of major portions of a slide fastener with a separable bottom end stop;

FIG. 2 is a front view of major portions of a fastener



stringer loaded with a box pin;

FIG. 3 is a bottom view of the fastener stringer;

FIG. 4 is a front view of major portions of a fastener stringer loaded with an insert pin;

FIG. 5 is a bottom view of the same fastener stringer;

FIG. 6 is a sectional view taken along a line VI-VI in FIG. 2;

FIG. 7 is a sectional view taken along a line VII-VII in FIG. 2;

FIG. 8 is a sectional view of a box;

FIG. 9 is a sectional view taken along a line IX-IX in FIG. 8;

FIG. 10 is a partially broken front view of a state in which the box and box pin are connected;

FIG. 11 is a partially broken front view showing a state in which the fastener stringer loaded with the insert pin is being engaged with the fastener stringer loaded with the box;

FIG. 12 is a partially broken front view showing a state in which the fastener stringer loaded with the insert pin is engaged with the fastener stringer loaded with the box;

FIG. 13 is a front view showing a modification of the reinforcement portion;

FIG. 14 is a front view showing another modification of the reinforcement portion;

FIG. 15 is a front view showing still another modification

of the reinforcement portion;

FIG. 16 is a front view showing a modification of the insert pin and the reinforcement portion;

FIG. 17 is a partially broken front view of the bottom end stop in which the box and the box pin are integrated;

FIG. 18 is a front view of an embodiment in which the fastener stringer is loaded with the reinforcement portion;

FIG. 19 is a sectional view taken along a line XIX-XIX in FIG. 18;

FIG. 20 is a side view of another embodiment in which the fastener stringer is loaded with the reinforcement portion;

FIG. 21 is a corresponding sectional view taken along a line XIX-XIX in FIG. 18; and

FIG. 22 is a front view of major portions in the slide fastener with other separable end stop.

#### DESCRIPTION OF THE PREFERRED EMBODIMENTS

Hereinafter, preferred embodiments of a slide fastener with a separable bottom end stop of the invention will be described with reference to the drawings.

As shown in FIG. 1, in the slide fastener with the separable bottom end stop, a fastener chain 1 is not a closed product with a bottom end stop but an openable product, that is, provided with a separable bottom end stop 5 which enables right and left fastener stringers 2 to be separated completely.

Fastener elements 4 are mounted on a core portion 6 provided on a side edge of a fastener tape 3. A box pin 8 as the separable bottom end stop 5 is mounted on the core portion 6 continuously with the bottom end of the fastener element 4 of one side fastener stringer 2 and an insert pin 9 as the separable bottom end stop 5 is mounted on the core portion 6 continuously with the bottom end of the fastener element 4 of the other fastener stringer 2. As shown in FIG. 10, the fastener stringer 2 with the separable bottom end stop provided with the box pin 8 and a box 7 is produced and combined with the fastener stringer 2 loaded with the insert pin 9 so as to complete the slide fastener with the separable bottom end stop.

In the slide fastener with the separable bottom end stop according to a first embodiment shown in FIGS. 2 to 12, a flat reinforcement portion 10 is provided integrally with a side face of the box pin 8 attached to one side fastener stringer 2 of the fastener chain 1 such that it is extended to the surface of the fastener tape 3 as shown in FIG. 2. On the other hand, a flat reinforcement portion 10 is provided integrally with a side face of the insert pin 9 attached to the other fastener stringer 2 such that it is extended to the surface of the fastener tape 3 as shown in FIG. 4. The fastener elements 4, box pin 8, insert pin 9, box 7 and reinforcement portion 10 in the fastener chain 1 are formed integrally with the fastener tape 3 by injection molding means using thermoplastic resin such as

polyacetal and polyamide.

As shown in FIGS. 2 to 5, the box pin 8 and insert pin 9 are provided with the reinforcement portions 10 which are protruded outward from the side faces thereof while the surfaces thereof are extended flatly. As shown in FIGS. 2 and 3, as the reinforcement portion 10 for the box pin 8, an inside portion 11 and an outside portion 12 are provided from the side face of a lower half portion of the box pin 8 such that they are protruded outward on the fastener tape 3. In the inside portion 11 adjacent to the box pin 8, plural ribs 13a protrude from a side face of the box pin 8 and are disposed obliquely as seen in a plan view and concave portions 14 are formed among the oblique ribs 13a. The concave portions 14 are formed in various kinds of shapes, such as square, diamond, circular or oval and as shown in FIG. 6, into a through-hole configuration or into a concave shape having a thin bottom portion. Consequently, the inside portion 11 of the reinforcement portion 10 is provided with flexibility through the ribs 13a and concave portions 14 and further, by forming an intersecting portion between the ribs 13a into a circular or curved shape, an external force applied to the reinforcement portion 10 is scattered.

As for the size of the inside portion 11 in the reinforcement portion 10, width W from an inside end faces of the fastener elements 4 toward an inside of the fastener tape 3 is within 4.0 mm. The width of the fastener tape 3 in the

slide fastener Nos. 3 to 5 preferably used for ordinary purpose is 13 to 16 mm and thus, it is as large as it can be formed within about 30% the width of this fastener tape 3. Although the ratio between the inside portion 11 and the outside portion 12 may be changed according to the size of the slide fastener or customer's demand, it is important that the inside portion 11 exists in a portion in which it can go through between flanges 36 of a slider 35 while the outside portion 12 exists in a portion in which the fastener stringer 2 is to be sewed to a sewing object. Further, the bottom edge of the reinforcement portion 10 in the inside portion 11 is provided with a cut-out 15 which is dented upward so as to absorb part of an external force applied to the end portion of the fastener tape 3 such as a twisting force. In the meantime, the upper edge of the inside portion 11 can be also provided with the cut-out 15.

The outside portion 12 of the reinforcement portion 10 is formed adjacent to the inside portion 11 and the outside portion 12 is formed of thicker ribs 13b, 13c than the ribs 13a in the inside portion 11. The ribs 13b are formed such that they extend in parallel in a width direction of the fastener tape 3 and have a predetermined interval therebetween in a length direction of the fastener tape 3. Preferably, the sectional shape of the ribs 13b is an isosceles triangle while the inclination angle of the side face is about 60° as shown in FIG. 7, that is, the angle  $\alpha$  shown in FIG. 7 satisfies the

condition of  $\alpha \leq 30^\circ$ . By securing a large interval between the ribs 13b and forming the sectional shape of the ribs 13b into the shape described above, the frequency that a sewing needle may contact the ribs 13b when the fastener stringer 2 is sewed to a sewing object is reduced thereby preventing the ribs 13b from being damaged. Further, front ends of the plural ribs 13b are connected by a rib 13c extending in the length direction of the fastener tape 3. The rib 13c has a parallel portion 13c-1 extending in a parallel direction with the length direction of the fastener tape 3 at a bottom end side of the outside portion 12 and a bent portion 13c-2 bending in a direction parting from an outside edge portion of the fastener tape 3 at an upper end side of the outside portion 12. The rib 13c has the same sectional shape as that of the rib 13b. Due to the bent portion 13c-2 of 13c, the rib 13b and the rib 13c-2 are connected at obtuse angle at an upper corner of a flame 16. Therefore, since the upper corner of the flame 16 is not acuminate, the upper corner of the flame 16 of the reinforcement portion 10 are prevented from hitching other object and thereby separation of the reinforcement portion 10 from the fastener tape 3 is avoided. In the reinforcement portion 10 of the outside portion 12, the frame 16 is formed with the rib 13b and the rib 13c, thereby forming a stable configuration. Consequently, when the fastener stringer 2 is nipped with fingers, it is easy to be nipped because an appropriate stiffness exists, so that the

operation of the bottom end stop can be carried out easily.

As for the configuration of the box pin 8 formed on the core portion 6 of the fastener tape 3, a recess 17 is provided on an opposite face to the face on which the reinforcement portion 10 is formed. A partition plate 29 provided between a front wall 25 and a rear wall 26 of the box 7 is engaged with this recess 17 so as to integrate the box pin 8 with the box 7.

In the reinforcement portion 10 of the fastener stringer 2 loaded with the insert pin 9, as shown in FIGS. 4 and 5, the inside portion 11 and the outside portion 12 are provided on a side face of the lower half portion of the insert pin 9 such that it is protruded outward on the fastener tape 3 like the fastener stringer 2 loaded with the box pin 8. Plural ribs 13a protrudes from a side face of the insert pin 9 and are disposed obliquely as seen in its plan view in the inside portion 11 adjacent to the insert pin 9 and the through-hole type concave portions 14 having no bottom or the concave portion 14 having a thin bottom portions are formed among the oblique ribs 13a so as to provide with flexibility and intersecting portions of the ribs 13a are formed in arc-like shape such as circular one so as to scatter an external force applied to the reinforcement portion 10. Because the reinforcement portion 10 is provided on the lower half portion which is a part of each of the box pin 8 and insert pin 9, the reinforcement portion 10 having

flexibility can be formed.

The inside portion 11 in the reinforcement portion 10 is formed within about 30% of the width of the fastener tape 3 like the fastener stringer 2 loaded with the box pin 8. The cut-out 15 is provided in the lower edge of the reinforcement portion 10 in the inside portion 11 so as to absorb part of an external force such as a twisting force applied to the end portion of the fastener tape 3. In the meantime, the cut-out 15 may be provided on the upper edge of the inside portion 11.

The outside portion 12 of the reinforcement portion 10 is formed continuously with the inside portion 11 like the fastener stringer 2 loaded with the box pin 8 and the outside portion 12 is formed of thicker ribs 13b, 13c than the ribs 13a in the inside portion 11. The ribs 13b are so provided that they extend in parallel in a width direction of the fastener tape 3 toward the outside of the fastener tape 3 and have a predetermined interval therebetween in a length direction of the fastener tape 3, the front ends of which are connected by the rib 13c extending in the length direction of the fastener tape 3 so as to form the flange 16. The rib 13c has the parallel portion 13c-1 extending in the parallel direction with the length direction of the fastener tape 3 at the bottom end side of the outside portion 12 and the bent portion 13c-2 bending in the direction parting from the outside edge portion of the fastener tape 3 at the upper end side of the outside portion 12. Due



to the bent portion 13c-2 of 13c, the rib 13b and the rib 13c-2 are connected at obtuse angle at the upper corner of a flange 16. Therefore, since the upper corner of the flange 16 is not acuminate, the upper corner of the flange 16 of the reinforcement portion 10 are prevented from hitching other object and thereby separation of the reinforcement portion 10 from the fastener tape 3 is avoided. Each of the ribs 13b and 13c is formed such that the sectional shape is an isosceles triangle and the inclination angle of the side face is about  $60^{\circ}$ , so that contact with the sewing needle is avoided at the time of sewing of the fastener stringer 2, thereby protecting the ribs 13 from a damage.

The reinforcement portions 10 constituted of the inside portions 11 and outside portions 12, which are to be formed on the fastener stringers 2 loaded with the box pin 8 and insert pin 9, are formed on the front and rear surfaces of the fastener tape 3 by injection molding as shown in FIGS. 3 and 5, so that the front and rear surfaces of the fastener tape 3 are sandwiched by the reinforcement portions 10. The reinforcement portions 10 may be formed on only a single surface of the fastener tape 3, not on both sides.

In the box 7 to be attached to the fastener stringer 2 loaded with the box pin 8, which is a rectangular solid, as shown in FIGS. 8 and 9, the narrow partition plate 29 is provided at an upper portion in the center between the front wall 25 and

the rear wall 26 and an engaging portion 32 is provided on the bottom end of the partition plate 29. An insertion hole 28 which is an opening equal to the thickness of the inside portion 11 of the reinforcement portion 10 and through which the fastener stringer 2 loaded with the box pin 8 can be inserted, is provided in a side wall 27 located sideway of the box 7 while a box pin insertion hole 30 through which the box pin 8 can be inserted is provided between the insertion hole 28 and the partition plate 29. An insertion hole 28, which is an opening equal to the thickness of the inside portion 11 of the reinforcement portion 10 and through which the fastener stringer 2 loaded with the insert pin 9 can be inserted, is provided up to the bottom portion of the other side wall 27 while an insert pin insertion hole 31 through which the insert pin 9 can be inserted is provided between the insertion hole 28 and the partition plate 29, so that the box 7 is completed.

As shown in FIG. 10, the box pin 8 of the fastener stringer 2 loaded with the box pin 8 is inserted into the box pin insertion hole 30 in the completed box 7 and the inside portion 11 of the reinforcement portion 10 is inserted into the insertion hole 28 in the side wall 27 and the partition plate 29 provided in the box 7 is pressed into the recess 17 provided in the side face of the box pin 8. As a result, the engaging portion 32 provided on the bottom end of the partition plate 29 engages an end of the recess 17, thereby the box pin 8 and the box 7

being integrated with each other and fixed.

When the fastener stringer 2 loaded with the insert pin 9 is mounted on the fastener stringer 2 loaded with the box 7, with a slider 35 being slid to contact the top end of the box 7 and held in contact therewith as shown in FIG. 11, the insert pin 9 is inserted into a guide groove 37 in the slider 35 by nipping the reinforcement portion 10 of the fastener stringer 2 loaded with the insert pin 9. Further, the inside portion 11 of the reinforcement portion 10 is inserted between the flanges 36 so that the insert pin 9 is inserted into the insert pin insertion hole 31 in the box 7. After that, if the slider 35 is pulled and slid by nipping the reinforcement portion 10, the fastener chain 1 in which the fastener elements 4 on the right and left fastener stringers 2 engage each other is completed as shown in FIG. 12.

The separable bottom end stops 5 shown in FIGS. 13, 14 and 15 indicate modifications of the outside portion 12 in the reinforcement portion 10. In the reinforcement portion 10 shown in FIG. 13, the installation ranges of the inside portion 11 and the outside portion 12 are formed long and widely relative to the box pin 8 and insert pin 9. Consequently, the quantity of the ribs 13b extending in the lateral direction in the frame 16 in the outside portion 12 is increased and range to be reinforced on the outer edge of the fastener tape 3 becomes wider.

In the reinforcement portion 10 shown in FIG. 14, although the installation range of the inside portion 11 to the box pin 8 and insert pin 9 is equal to that in the first embodiment, the arrangement of the ribs 13b in the outside portion 12 is different. That is, none of the ribs 13b in the outside portion 12 is disposed in the lateral direction within the frame 16, but a single rib 13c is disposed vertically so that the rib 13c can be deviated from a sewing line by a sewing machine, thereby reducing the frequency of damage of the rib 13c. Consequently, the fastener stringer 2 can be sewed securely and effectively. Further, because the reinforcement portion 10 shown in FIG. 15 has no rib 13c on the outside end of the outside portion 12 so that no frame 16 is formed, the outside of the reinforcement portion 10 can be provided with flexibility.

Regarding the reinforcement portion 10 for the insert pin 9 shown in FIG. 16, the bottom end of the reinforcement portion 10 formed integrally on the side of the insert pin 9 is located inside of the bottom end of the insert pin 9 such that it is spaced from the bottom end of the fastener tape 3, that is, there exists a surplus portion of the fastener tape 3 below the bottom end of the reinforcement portion 10 as compared to the bottom end of the insert pin 9. Due to this configuration, if any external twisting force is applied to the fastener tape 3, it is not directly directed to the ribs 13a, 13b, but it is directed to the surplus portion of the fastener tape 3 firstly. Therefore,

the ribs 13a, 13b are not easily separated from the fastener tape 3.

Further, a heat cut method is adopted in order to cut out a separate fastener stringer 2 of a predetermined length from the fastener stringer continuing in the length direction. Since the bottom end portion of the fastener stringer 2 is cut with heat, yarns composing the fastener tape 3 adhere to each other where an adhered portion 19 is formed. As a result of forming the adhered portion 19 at the cut end portion of the fastener tape 3, the cut end portion are prevented from fraying. Further, the heat cut is carried out along a cut line parallel in the width direction of the fastener tape 3 with a position adjacent to the bottom end of the insert pin 9 as a reference point such that the core portion 6 of the fastener tape 3 extends lower than the bottom end of the insert pin 9 only a little, and thereby an excellent texture is obtained. Additionally, this is applicable for the fastener stringer 2 loaded with the box pin 8.

In the reinforcement portion 10 shown in FIG. 17, the box pin 8 and box 7 are formed integrally. Thus, part of the inside portion 11 of the reinforcement portion 10 is formed integrally with the box 7 so that they can be fixed firmly.

In the reinforcement portion 10 shown in FIGS. 18 and 19, in order to firmly fix the reinforcement portion 10 to the fastener tape 3, warp yarns 21 on the outside edge portion in

a woven fastener tape 3 are pulled out from a certain area so that a rough woven fabric in which only weft yarns 22 exist is formed so as to provide a rough structure 20. In the case of a warp knitted fastener tape 3, its warp knitting yarns are pulled out so as to form a rough knitting fabric to provide the rough structure 20. By forming one of the ribs 13c of the frames 16 existing on an outer end portion of the outside portions 12 in the reinforcement portions 10 opposite to the box 7 integrally on the front and rear surfaces of the rough structure 20 of woven fabric or knit fabric, part of synthetic resin for forming the frames 16 penetrate into the rough structure 20, so that the reinforcement portions 10 are fixed on the fastener tape 3 firmly by fusion.

In the reinforcement portions 10 shown in FIGS. 20 and 21, the rough structure 20 is provided on the outside edge portion of the woven or knit fastener tape 3 like the above-described embodiment and the inside portions 11 of the reinforcement portions 10 are formed on the front and rear faces of the core portion 6 of the fastener tape 3 while one of the ribs 13c of the frame 16 on the outer end portion of the outside portion 12 of the reinforcement portion 10 opposite to the box 7 is disposed on the rough structure 20 and the frame 16 is fused with the rough structure 20. Consequently, the reinforcement portions 10 are fixed on the fastener tape 3 firmly.

The embodiment shown in FIG. 22 shows an example applied

to a double side openable type separable bottom end stop 5. An end of one fastener stringer 2 is loaded with the box pin 8 and an end of the other fastener stringer 2 is loaded with the insert pin 9. The right and left fastener stringers 2 have no box 7 and two sliders 35 are mounted slidably in opposite directions so that the fastener chain 1 is opened/closed from both sides and can be separated to the right and left sides.

The relatively long box pin 8 which two sliders 35 can pass is formed on the core portion 6 of one fastener tape 3 in this slider fastener. A flange 36 of each of the slider 35 makes contact with the front end of this box pin 8 and a stopper 18 for stopping the sliding of the slider 35 is formed such that it is extended horizontally. A front end of the stopper 18 is extended up to one of the thick ribs 13c of the outside portion 12 in the reinforcement portion 10. A thin protruded piece 33 which is protruded sideways is provided on the top end of the box pin 8 in step-like configuration, so that it is capable of overlapping a step-like protruded piece 33 provided on the top end of the insert pin 9.

The relatively long insert pin 9 which the two sliders 35 can pass is formed on the core portion 6 of the other fastener tape 3. The protruded piece 33 which coincides with the protruded piece 33 of the box pin 8 and overlap the protruded piece 33 is provided on the top end of the insert pin 9. The inside portion 11 of the reinforcement portion 10 is formed such

that its end side is expanded so as to coincide with a blade of the slider 35 in order to allow the wide blades on the shoulder side of the slider 35 to pass.

As for the usage condition of the separable bottom end stop 5, with two sliders 35 mounted on the fastener stringer 2 loaded with the box pin 8 such that they are directed in opposite directions, the slider 35 is kept in contact with the stopper 18 of the box pin 8, the insert pin 9 of the fastener stringer 2 loaded with the insert pin 9 is inserted. Then, the upper slider 35 is pulled upward so as to engage the fastener elements 4 on the right and left fastener stringers 2 with each other, thereby completing the fastener chain 1. To separate the fastener chain 1, if the fastener stringer 2 loaded with the insert pin 9 is pulled out of the two sliders 35 after the two sliders 35 are pulled down to the stopper 18, the right and left fastener stringer 2 can be disconnected and released.

The slide fastener with the separable bottom end stop has the above-described configuration and with this configuration, following effects are exerted.

The fastener elements 4 are mounted on the opposing side edges of a pair of the fastener tapes 3 and the separable bottom end stop 5 made of synthetic resin is provided on one of the side edges of each of the fastener tapes 3 at one of end portions of those fastener elements 4 and the reinforcement portion 10 is formed integrally with the separable bottom end stop 5 such



that it is extended on at least one surface of the fastener tape 3. Because the reinforcement portion 10 is constituted of plural ribs 13a disposed obliquely as seen in its plan view in the inside portion 11 connected to the separable bottom end stop 5, even if a bending force or a twisting force is applied to the end portion of the fastener stringer 2 in the slide fastener with separable bottom end stop 5, the ribs 13a disposed obliquely in the inside portion 11 of the reinforcement portion scatter the external force effectively and are easy to deform. Therefore, this prevents the separable bottom end stop 5 from being damaged and blocks the reinforcement portion 10 provided on the end portion from being caught by other things and separated from the fastener tape 3.

In addition to the above-described effect, in the reinforcement portion 10, the ribs 13a, 13b and 13c are disposed symmetrically on both surfaces of the fastener tape 3 and the inside portion 11 is formed thinner than the outside portion 12. The reinforcement portions 10 sandwich both surfaces of the fastener tape 3, so that the reinforcement portions 10 can be fixed firmly and the inside portions 11 of the reinforcement portions 10 are formed with softness and flexibility.

Because the intersecting portion of the ribs 13a is formed in arc-like configuration as seen in its plan view, an external force applied to the reinforcement portion 10 can be scattered easily. Further, because the concave portions 14 are formed

among the ribs 13a in the inside portion 11 of the reinforcement portion 10, they allow the ribs 13a of the reinforcement portion 10 to be deformed and reinforced easily. Moreover, because the cut-out 15 which is dented toward the top end is formed at the bottom edge of the inside portion 11 of the reinforcement portion 10, it absorbs a twisting force applied to the inside portion of the reinforcement portion 10 so as to reduce the load.

The reinforcement portion 10 is constituted of the inside portion 11 connected to the separable bottom end stop 5 and the outside portion 12 which is connected to the inside portion 11 and extended toward the outer edge of the fastener tape 3 and the outside portion 12 is formed of plural ribs 13b disposed in parallel with a predetermined interval. Consequently, the outside portion 12 of the reinforcement portion 10 is capable of reducing the frequency that the sewing needle may contact the ribs 13b at the time of sewing thereby preventing the ribs 13b from a damage.

Because, when the core portion 6 and the fastener tape 3 are cut out with heat with respect to the front end of each of the box pin 8 and insert pin 9, the bottom ends of the inside portion 11 and outside portion 12 of the reinforcement portion 10 are located inside of a cut line, the core portion 6 never turns to a rigid lump when the fastener tape 3 is cut with heat so that an excellent texture is maintained. Further, the ribs 13a, 13b and 13c of the reinforcement portion 10 are never

separated from the fastener tape 3, so that the separable bottom end stop 5 can be finished with good quality.

Because, in the fastener tape 3, a side edge portion opposing the outer end portion of the reinforcement portion 10 opposite to the box 7 is formed into the rough structure 20 by weaving or knitting so that the end portion of the reinforcement portion 10 is allowed to penetrate into the rough structure 20, a part of the outside portion 12 of the reinforcement portion 10 are allowed to penetrate into the structure of the fastener tape 3 and fixed therein, thereby the reinforcement portion 10 being attached firmly. Because, in the inside portion 11 of the reinforcement portion 10, width from an inside end faces of the fastener elements 4 toward an inside of the fastener tape 3 is within 4.0 mm, the inside portion 11 of the reinforcement portion 10 enables easy insertion/removal of the right and left fastener stringers 2, and the inside portion 11 can exert its function effectively with an optimum configuration.